

# Ambitious science mission sets off for Antarctica

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A team of British scientists is making final preparations for an ambitious Antarctic science mission.

The aim is to discover what's causing the recent rapid ice loss from Pine Island Glacier on the West Antarctic Ice Sheet and whether this loss will continue to increase or slow down. The research is important for understanding the likely impact on future sea-level rise.

Involving 35 scientists from around the world, the project team includes Professor Peter Clarke, Professor of Geophysical Geodesy at Newcastle University.

Dr Andy Smith, of the British Antarctic Survey (BAS), said: "We used to think that the volume of water flowing from Antarctica's [melting glaciers](#) and icebergs into the ocean was equal to the amount of water

falling as snow onto the [ice sheet](#); and that this process was keeping the whole system in balance.

"But Pine Island and Thwaites glaciers on the West Antarctic Ice Sheet (WAIS) are losing ice at a faster rate than they are being replenished. This affects sea level all over the world. The speed of changes to this region has taken scientists by surprise and we need to find out what's going on."

Professor Clarke adds: "By carrying out careful measurements of ice elevation and velocity, and changes in the shape of the solid Earth, we will be able to constrain much more accurately how this rapidly-changing part of Antarctica could be contributing to sea level changes worldwide."

Starting in November this year the iSTAR science programme will mount four projects focussed on finding out what's causing the rapid changes observed in the Amundsen Sea region of the West Antarctic Ice Sheet.

Using state-of-the-art technologies, science teams will measure changes to the flow and thickness of glaciers and investigate the role that the ocean plays in transporting warm water beneath ice shelves.

The first group of scientists depart the UK for Antarctica to spend 10 weeks travelling 600 miles (1000km) across the ice sheet by tractor-traverse. They will use ground-based radar and seismic technologies to map the bed beneath Pine Island Glacier. These will help reveal the influence that glacier bed conditions may have on varying the flow and thickness of ice all the way from the floating shelf up into its inland tributaries. Satellite remote sensing technology will allow the science team to measure the changing configuration of the glacier in areas that are inaccessible from the ground.

In January 2014 a team will sail into the Amundsen Sea onboard the RRS James Clark Ross to spend 30 days putting a range of instruments and devices into the ocean near Pine Island Glacier to discover when, where, and how warm ocean water gets close to the ice. Ocean measurements and observations are essential for improving a wide variety of computer models used by the international scientific community to forecast future climate and sea level.

A fleet of ocean robots known as Seagliders will measure the temperature, saltness and current speeds at different depths in the water. Each time the Seaglider reaches the ocean surface it will send back data using satellite phone technology. The scientists will use the information from Seagliders to work out how the warm water is reaching the iceshelf and whether this is likely to continue in future.

To collect data during the Antarctic winter, when the ocean surface is covered by sea ice and inaccessible for research ships, the team is enlisting the help of 15 seals. Tiny sensors, temporarily glued to their fur, will capture information such as the temperature and the saltness. Satellite technology will send information back to the scientists in their laboratories. This research also provides biologists with a better indication of how vulnerable seals might be to climate change. The sensors fall off when the seals moult their fur.

An unmanned submarine (Autosub1), capable of diving beneath the ice, will make measurements along a pre-defined track then return to the ship with the data. To understand the rate at which the thickness of the ice changes four autonomous radar instruments, engineered to allow year-round operation, will monitor the gradual change of ice shelf thickness with time. This investigation will help the science team determine how heat is transported beneath the [ice](#) shelf by ocean currents and what impact changes in the climate will have on this part of Antarctica.

The iSTAR programme – investigating the stability of the West Antarctic Ice Sheet - is funded by the Natural Environment Research Council (NERC).

Provided by Newcastle University

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